

HORIZONS
PROTOTYPE SYSTEMS
AND
ADVANCED TECHNOLOGIES

Heralding the twenty-first century is Horizons, the latest addition to Epcot Center's Future World. Presented by General Electric, Horizons explores future habitats on land, at sea, and out in space. Research for this pavilion was extensive. Horizons incorporates the ideas of the existing pavilions in Future World, covering the topics of communications, energy, transportation, creativity, and future technologies.

Listed here are new technologies and prototype systems created for entertainment and support applications in Horizons.

Projection and Camera Systems

"Omnisphere" - The fish-eye view of the "Omnishpere" images portrays micro and macro-worlds in a ride-through attraction. This viewing area incorporated Imax and Omnimax camera and projection systems. the Imax system uses 70mm film (15 perforations per frame), projected on a slightly curved screen. Omnimax is the same system, adapted to a fish-eye lens, with footage projected on a spherical screen.

The "Omnishpere" features the largest screen and the largest motion picture film format in the world. The Imax frame area is about ten times the area of a 35mm feature film frame. Disney "Imagineers" designed the "Omnisphere" to engulf guests' senses, so they would literally ride through gigantic images the size of an eight-story building. By putting two standard Omnimax screens together (two hemispheres set at an angle to each other, joined with a cylindrical screen), the "Omnisphere" screen measures 80 feet high and 240 feet across.

The "Omnisphere" projector uses a unique traveling loop system, with the 70mm film running horizontally instead of vertically.

The "Omnishpere" film crew pioneered several photographic "firsts." These include: the first Omnimax computer animation of Earth from outer space, based on Landsat (U.S. government satellite) data; a voyage through a DNA molecule, based on X-ray crystallography; the first Imax micro-photography of crystals and computer chips; and the first use of a double Omnimax screen.

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"Choose Your Tomorrow" Video Sequences - The Horizons ride-through attraction culminates in a visual experience chosen by the four guests in each vehicle. There are three point-of-view choices: a submarine ride, a hovercraft ride, and a spacecraft ride.

Each video view is 40 to 50 seconds long. The footage was shot in 35mm film, and transferred to videodisc for rear projection using the General Electric 5055 video projector. The video screen is 6 feet wide by 5 feet high, with viewers about 6 feet away from the screen, filling most of the viewer's field of vision.

Models were constructed in forced scale for each scene, and shot using the MARS (Multi-Aperture Relay System) lens, a long lens that looks somewhat like a snorkel suspended from a rig. To achieve the dramatic effects of flying through the miniature models, special rigs were designed to hold the camera for motion control, a special motion control system was designed and built by the Disney "Imagineers."

Each axis of movement was programmed individually, first tracking shots (general speed, with speed-ups and slow-downs), then pans (holding on the model), then a rolling movement for turns. This computer system was designed to be used with "downshooter" animation camera systems, and is known as the IMC 3565, now owned by the Disney Studios.

The MARS lens, having the ability to be mounted in several configurations, could be turned to shot upside-down, as in the space sequence showing the under-side of a space asteroid. Other unusual effects include motion-control in the desert hovercraft sequence, allowing a depth of field of from 2 1/2 inches in the foreground to larger scale hills over 80 feet away. The underwater sequence was shot "dry for wet" on a smoked set; creating the illusion of being underwater.

Show Elements

A. Interactive Show Techniques

"Choose Your Tomorrow" Electronics Technology - The Horizons ride-through attraction culminates in three possible visual experiences. Each guest votes for the experience of his choice, on one of four touch-screen panels within each vehicle. In case of a tie, the computer randomly selects one of the tied experiences for the viewers.

The vote is transmitted via infra-red beam, and sent to the video system, which controls nine laserdisc players. Each laserdisc is assigned to a different vehicle. This video processing system moves the image produced by a laserdisc across a field of seven General Electric P.J. 5055 light-valve video projectors.

The edges of the projected video sequences are matched as the projection moves across the 45-foot screen expanse, creating a continuous image. The chosen video image is synchronized to the vehicle, and moves along with it at 1 1/2 feet per second. The projection surface and the projectors are stationary. the vehicle, as well as the projectors, are tipped ten degrees to create an illusion of acceleration.

Forming an arc with a 34 1/2 foot radius, the screen is a prototype design composed primarily of Lexan, a polycarbonate of clear plastic.

B. Ride-through Vehicle

Guest Selection Processing Electronics - The Horizons ride-through vehicle is a unique gondola design, suspended from a track running throughout the pavilion. An on-board computer, the Guest Selection Processing Electronics (GSPE) system, works along with the show function of "Choose Your Tomorrow."

This on-board computer advises four maintenance points throughout the attraction of the status of each vehicle, through infra-red signal. The system scans each vehicle's lighting, audio, and motor control system, for comprehensive surveillance of maintenance conditions at all times.

A low-frequency generator, which looks like a small speaker, is attached to each vehicle. The "Body Sonic" device vibrates the vehicle, increasing the sense of movement as the vehicles move through the pavilion. An infra-red audio link to each vehicle is distributed by the on-board computer.

C. Special Effects

Fiber Optics - Fiber optics are used extensively throughout the Horizons pavilion. They appear in many of the ride-through attractions scenes, with a total use of 932,425 feet (177 miles) of fiber optic cord. The special effect requiring the heaviest use of fiber optics was the wall leading into the "Looking Back at Tomorrow" section. This wall consists of sand-blasted acrylic cloud formations, with 21,000 fibers installed in hand-drilling holes.

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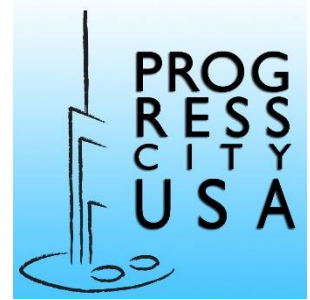
Holograms - The Horizons ride-through attraction story incorporates the effect of "Simulated Holography," or virtual 3-D T.V., where characters appear to one another as holograms transmitted on screens. This is a special effect developed by the WED team of "Imagineers." The actual technology of transmitting holograms does not yet exist: this simulated effect only suggests possibilities for the future.

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